

Claims

1. A method of making a surface covering which comprises the sequential steps of:
 - a. applying a plastic layer over a substrate,
 - 5 b. heating the plastic layer to a temperature which gells the plastic layer to form a gelled plastic layer having a surface,
 - c. applying to the surface of the gelled plastic layer a first printing ink containing a first photoinitiator in a first pattern or a first design,
 - 10 d. applying a first, non-curable coating made from a plastisol or organosol over the gelled plastic layer and first printing inks
 - e. gelling said first non curable coating,
 - f. applying a second, curable coating over said first coating and optionally drying it,
 - g. mechanically embossing the second, curable coating,
 - 15 h. activating said first photoinitiator and curing the surface areas of the second, curable coating disposed over the first printing ink,
 - i. heating the second, curable coating, the plastic layer and the substrate, wherein the mechanical embossing in areas that are not disposed over the first printing ink is relaxed,
 - 20 j. optionally mechanically embossing the second, curable coating in areas that are not disposed over the first printing ink
 - k. curing the second, curable coating.

2. The method according to claim 1 wherein during step g), the first coating is also embossed.
3. The method according to claim 1, wherein the curable coating of step (f) comprises an urethane derived polymer.
- 5 4. The method of claim 3, wherein the curable coating of step (f) comprises polyurethane.
5. The method of claim 4, wherein the curable coating of step (f) essentially consists in polyurethane.
- 10 6. The method according to any of the claims 1 to 5 wherein after step h) of activating said first photoinitiator a liquid photoinitiator is applied onto the curable coating.
7. The method of any of claims 1 to 5, wherein :
 - said curable coating further comprises a thermal initiator
 - said thermal initiator is activated during step k).
- 15 8. The method according to any of the preceding claims wherein :
 - the plastic layer applied in step a) comprises a foaming agent,
 - the heating of step b) is performed without activating the foaming agent,
 - the first printing ink of step c) further contains an expansion inhibitor
 - the foaming agent is activated during step i).

9. The method according to any of the claims 1 to 7 wherein
- the plastic layer applied in step a) comprises a foaming agent,
 - the heating of step b) is performed without activating the foaming agent,
 - the first printing ink of step c) optionally contains an expansion inhibitor
- 5 • between step c) and step d), a second printing ink containing a second photoinitiator and/or an expansion inhibitor is applied to the surface of the gelled plastic layer in a second pattern or a second design,
- the foaming agent is activated during step i),
 - the second photoinitiator is activated during step k).
- 10 10. The method according to claim 9 wherein the first photoinitiator has a higher diffusion coefficient than the second photoinitiator.
11. The method according to claim 9 wherein said second photoinitiator is selected among those having a migration time into said surface area of the curable coating greater than the migration time of said first photoinitiator into said surface area of
- 15 the curable coating.
12. The method according to claim 9 wherein the first photoinitiator is activated by a different wavelength than the second photoinitiator.
13. The method according to claim 9, wherein the first photoinitiator is activated by a lower energy level than the second photoinitiator.
- 20 14. The method according to claim 9, wherein the first photoinitiator is selected among those which are sensitive to a first range of electromagnetic radiations, and said second photoinitiator is selected among those which are sensitive to second

range of electromagnetic radiations but insensitive to said first range of electromagnetic radiations.

15. The method according to any of the claims 9 to 14, wherein said second photoinitiator is applied onto substantially the entire surface of the curable coating prior to step (h) of activating said first photoinitiator.

16. The method according to claim 15, wherein the electromagnetic radiations essentially consist in UV radiations.

17. The method according to any of the claims 1 to 5 wherein

- the plastic layer applied in step a comprises a foaming agent,
- the heating of step b) is performed without activating the foaming agent,
- the second, curable coating further comprises a thermal initiator
- the thermal initiator is activated during step k)

18. The method according to any of the claims 1 to 5 wherein the curing of step k) is operated by electron beam irradiation.

19. The method of any of the claims 1 to 18, wherein the surface covering is cooled and then the surface is reheated to soften it prior to optionally mechanically embossing.

20. The method of any of the claims 1 to 19, wherein after gelling the plastic layer in step (b) the surface covering is cooled prior to applying the printing ink.

21. A surface covering obtained by the method according to any of the claims 1 to 20, which comprises:
a. a substrate,

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- 5 b. a plastic layer overlaying the substrate,
 c. an ink printed in a pattern or design on said plastic layer,
 d. a non cured coating overlaying the plastic layer and the ink
 e. a cured coating overlaying the non-cured coating wherein the cured
 coating overlaying the ink is mechanically embossed.

22. A surface covering which comprises:

- a. a substrate,

 b. a foamed and chemically embossed plastic layer overlaying the sub-
 strate,
10 c. an ink containing a photoinitiator printed in a design on said foamed
 plastic layer,

 d. a non cured coating or a non cured layer overlaying the foamed plas-
 tic layer and ink

 e. a cured coating or a cured layer overlaying the non cured coating or
15 a non cured layer wherein the portion of the cured coating or the cured
 layer disposed over the ink is chemically and/or mechanically em-
 bossed.

23. The surface covering of claim 22 wherein the ink also contains an inhibitor.

- 20 24. The surface covering of claim 22 or 23 wherein the portion of the cured coating or
 cured layer, which is not disposed over the ink, is mechanically embossed with a
 texture different from the mechanically embossed portion of the cured coating dis-
 posed over the ink.

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25. The surface covering of any of the claims 22 to 24 further the cured coating or cured layer comprising a polyurethane coating.

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